

Claims :

1. An electrically controlled light modulator device comprising at least one cell, said cell comprising at least

- 5 — two deformable dielectric layers (12,13) which meet at an interface, at least one of said layers consisting of viscoelastic relief forming gel (12),
- a first support electrode structure (14) arranged on one side of the dielectric layers (12,13),
- 10 — a second signal electrode structure (10) arranged on the other side of the dielectric layers (12,13) and opposite to the support electrode structure (14), and
- signal means for applying signal voltage between the support (14) and signal (10) electrode structures to generate electric field
- 15 passing through the two deformable dielectric layers (12,13) in order to create surface reliefs on the viscoelastic gel layer (12),

**characterized** in that said light modulator cell further comprises

- a third enhancement electrode structure (40,50) composed of one or more separate electrode zones arranged in the proximity of the
- 20 first signal electrode structure (10), and
- enhancement signal means for applying enhancement signal voltage between the enhancement electrode structure (40,50) and the signal electrode structure (10) in order to locally concentrate the electric field passing through the two deformable dielectric
- 25 layers (12,13) and therefore arranged to enhance the amplitude of the deformation of the viscoelastic gel layer (12).

2. The device according to the claim 1, **characterized** in that within a cell the enhancement electrode structure (50) and the signal electrode

30 structure (10) are arranged substantially in a single common plane respect to each other and facing the opposite support electrode structure (14).

3. The device according to the claim 2, **characterized** in that within a cell the electrode zones of the signal electrode structure (10) and the

35 electrode zones of the enhancement electrode structure (50) are positioned in an alternating manner so that an individual signal

electrode zone is located between at least two adjacent enhancement electrode zones.

- 5 4. The device according to the claim 1, **characterized** in that within a cell the enhancement electrode structure (40) and the signal electrode structure (10) are arranged in substantially different planes respect to each other and respect to the opposite support electrode (14).
- 10 5. The device according to any of the foregoing claims, **characterized** in that the enhancement signal voltage is arranged to be negative compared to the potential defined by the support electrode structure (14).
- 15 6. The device according to any of the foregoing claims, **characterized** in that the enhancement signal voltage is arranged to be pulsed during or after the switching off period of said cell in order to actively enhance the relaxation of the viscoelastic gel layer (12).
- 20 7. The device according to any of the foregoing claims, **characterized** in that said enhancement electrode structure (40,50) is an opaque structure lithographically generated on the surface of a conductor plated substrate.
- 25 8. The device according to any of the foregoing claims 1-6, **characterized** in that said enhancement electrode structure (40,50) is an optically transparent structure formed from indium tin oxide.
- 30 9. The device according to any of the foregoing claims, **characterized** in that an electrically insulating layer (41,51) is arranged on one or both sides of said enhancement electrode structure (40,50).
10. The device according to any of the foregoing claims, characterized in that the material of the viscoelastic relief forming gel (12) is selected from the following group: polymer silicone compound, oil.
- 35 11. The device according to any of the foregoing claims, **characterized** in that the elastic modulus of the material of the viscoelastic relief

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forming gel (12) is selected to have a lower value in order to enhance the viscoelastic material flow during the on and off switching of a cell.

12. The device according to any of the foregoing claims, **characterized**  
5 in that multiple cells are arranged to form a display device.